AI-TECH-16B

PATENT APPLICATION
Serial No. 10/774,882

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A molecularly flexible dielectric electronic substrate having a modulus of elasticity less than about 500,000 psi, said molecularly flexible dielectric electronic substrate comprising:

~~at least one~~ a first layer of molecularly flexible dielectric adhesive having a modulus of elasticity less than about 500,000 psi, having a glass transition temperature less than about 0°C, and having the ability to withstand soldering at a temperature of about 220°C;

a metal foil on ~~one~~ a first surface of said first layer of molecularly flexible dielectric adhesive, wherein said metal foil is patterned to define a pattern of electrical conductors having a plurality of contact sites for receiving a plurality of contacts of an electronic device; and

a plurality of electrically conductive vias through said first layer of molecularly flexible dielectric adhesive, said plurality of electrically conductive vias being in a pattern for providing electrical connection between ones of said pattern of electrical conductors on the first surface of said first layer of molecularly flexible dielectric adhesive and corresponding contact sites on a second surface of said first layer of molecularly flexible dielectric adhesive opposite the first surface thereof.

2. (Original) The molecularly flexible dielectric electronic substrate of claim 1wherein said plurality of contact sites are in a pattern corresponding to a pattern of contacts of an electronic device.

3. (Previously Presented) The molecularly flexible dielectric electronic substrate of claim 1 further comprising an electronic device having a plurality of contacts soldered to corresponding ones of the contacts sites of the patterned metal foil on said molecularly flexible dielectric adhesive layer.

4. (Previously Presented) A molecularly flexible dielectric electronic substrate

comprising:

at least one layer of molecularly flexible dielectric adhesive having a modulus of elasticity less than about 500,000 psi, having a glass transition temperature less than about 0°C, and having the ability to withstand soldering at a temperature of about 220°C;

a metal foil on one surface of said layer of molecularly flexible dielectric adhesive, wherein said metal foil is patterned to define a pattern of electrical conductors having a plurality of contact sites for receiving the contacts of an electronic device;

an electronic device having a plurality of contacts soldered to corresponding contacts sites of the patterned metal foil on said molecularly flexible dielectric adhesive layer; and

a protective enclosure surrounding said electronic device and attached at least along its periphery to said molecularly flexible dielectric adhesive layer.

5. (Previously Presented) A molecularly flexible dielectric electronic substrate comprising:

at least one layer of molecularly flexible dielectric adhesive having a modulus of elasticity less than about 500,000 psi, having a glass transition temperature less than about 0°C, and having the ability to withstand soldering at a temperature of about 220°C;

a metal foil on one surface of said layer of molecularly flexible dielectric adhesive, wherein said metal foil is patterned to define a pattern of electrical conductors having a plurality of contact sites for receiving the contacts of an electronic device;

an electronic device having a plurality of contacts soldered to corresponding contacts sites of the patterned metal foil on said molecularly flexible dielectric adhesive layer; and

an underfill adhesive bonding said electronic device and said molecularly flexible dielectric adhesive layer.

6. (Original) The molecularly flexible dielectric electronic substrate of claim 5 wherein said underfill adhesive includes molecularly flexible dielectric adhesive having a modulus of elasticity less than about 500,000 psi.

7. (Original) The molecularly flexible dielectric electronic substrate of claim 1wherein said molecularly flexible dielectric adhesive has a modulus of elasticity less than about 100,000 psi.

8. (Original) The molecularly flexible dielectric electronic substrate of claim 1wherein said molecularly flexible dielectric adhesive has a modulus of elasticity less than about 20,000 psi.

9. (Original) A molecularly flexible dielectric electronic substrate comprising:

a first layer of molecularly flexible dielectric adhesive having a modulus of elasticity less than about 500,000 psi, having a glass transition temperature less than about 0°C, and having the ability to withstand soldering at a temperature of about 220°C;

a first metal foil on a first exposed surface of said first layer of molecularly flexible dielectric adhesive, wherein said first metal foil is patterned to define a pattern of first electrical conductors having a plurality of contact sites for receiving the contacts of an electronic device;

a second metal foil on a second exposed surface of said first layer of molecularly flexible dielectric adhesive opposing the first surface thereof, wherein said metal foil is patterned to define a pattern of second electrical conductors; and

a plurality of electrically conductive vias through said first layer of molecularly flexible dielectric adhesive, said plurality of electrically conductive vias being in a pattern for providing electrical connection between ones of said first electrical conductors and ones of said second electrical conductors.

10. (Original) The molecularly flexible dielectric electronic substrate of claim 9 further comprising:

a second layer of molecularly flexible dielectric adhesive having a modulus of elasticity less than about 500,000 psi, having a glass transition temperature less than about 0°C, and having the ability to withstand soldering at a temperature of about 220°C, wherein said second layer of molecularly flexible dielectric adhesive adheres to the second surface of said first layer of molecularly flexible dielectric adhesive with said patterned second metal foil therebetween;

a third metal foil on an exposed surface of said second layer of molecularly flexible dielectric adhesive, wherein said third metal foil is patterned to define a pattern of third electrical conductors; and

a plurality of second electrically conductive vias through said second layer of molecularly flexible dielectric adhesive, said plurality of second electrically conductive vias being in a pattern for providing electrical connection between ones of said second electrical conductors and ones of said third electrical conductors.

11. (Original) The molecularly flexible dielectric electronic substrate of claim 10 wherein said conductive vias are built up of plated metal.

12. (Original) The molecularly flexible dielectric electronic substrate of claim 10 wherein said molecularly flexible dielectric adhesive has a modulus of elasticity less than about 100,000 psi.

13. (Original) The molecularly flexible dielectric electronic substrate of claim 10 wherein said molecularly flexible dielectric adhesive has a modulus of elasticity less than about 20,000 psi.

14. (Original) The molecularly flexible dielectric electronic substrate of claim 9 wherein said molecularly flexible dielectric adhesive has a modulus of elasticity less than about 100,000 psi.

15. (Original) The molecularly flexible dielectric electronic substrate of claim 9 wherein said molecularly flexible dielectric adhesive has a modulus of elasticity less than about 20,000 psi.

16. (Original) The molecularly flexible dielectric electronic substrate of claim 9 in combination with at least one electronic device having a plurality of contacts thereon connected to at least certain ones of the contact sites of said first electrical conductors.

17. (Currently Amended) A method for making a molecularly flexible electronic substrate for receiving an electronic device comprising:

providing a sheet of metal foil;

providing on ~~one~~ a first surface of the sheet of metal foil ~~at least one~~ a first layer of a molecularly flexible dielectric adhesive having a modulus of elasticity less than about 500,000 psi, having a glass transition temperature less than about 0°C, and having the ability to withstand soldering at a temperature of about 220°C, the first layer of molecularly flexible dielectric adhesive having a plurality of via openings therein;

building up electrically conductive material on the first surface of the metal foil to fill the ~~via openings,~~ plurality of via openings in the first layer of molecularly flexible dielectric adhesive, thereby forming a plurality of electrically conductive vias therein;

wherein the plurality of electrically conductive vias are in a pattern for providing electrical connection between the metal foil and corresponding contact sites on a second surface of the first layer of molecularly flexible dielectric adhesive opposite the first surface thereof;

patterning the metal foil to form a pattern of contacts and conductors electrically connected to the electrically conductive vias in the first molecularly flexible dielectric adhesive layer; and

plating at least one of the electrically conductive vias and the contacts of the

patterned metal foil to provide external contacts.

18. (Currently Amended) The method of claim 17 further comprising:

providing a second metal foil on [[a]] the second surface of the ~~at least one~~ first layer of molecularly flexible dielectric adhesive opposing the first surface thereof, wherein the second metal foil electrically connects to the plurality of electrically conductive vias in the ~~at least one~~ first molecularly flexible dielectric adhesive layer; and

patterning the second metal foil to form a pattern of contacts and conductors electrically connected to ~~the~~ ones of the plurality of electrically conductive vias in the ~~at least one~~ first molecularly flexible dielectric adhesive layer.

19. (Currently Amended) The method of claim 17 further comprising:

after said patterning the metal foil, providing on the surface of the electrical conductors of the patterned sheet of metal foil not having the ~~at least one~~ first layer of molecularly flexible dielectric adhesive thereon ~~at least~~ a second layer of a molecularly flexible dielectric adhesive having a modulus of elasticity less than about 500,000 psi, having a glass transition temperature less than about 0°C, and having the ability to withstand soldering at a temperature of about 220°C, the ~~at least~~ second layer of molecularly flexible dielectric adhesive having a plurality of via openings therein; and

building up electrically conductive material on the metal foil to fill the plurality of via openings in the ~~at least~~ second layer of molecularly flexible dielectric adhesive, thereby forming a plurality of electrically conductive vias therein.

20. (Currently Amended) The method of claim 17 further comprising electrically connecting contacts of at least one electronic device to corresponding ones of the plurality of electrically conductive vias.

21. (Previously Presented) The molecularly flexible dielectric electronic substrate of

claim 1further comprising a plated electrically conductive layer on at least the contact sites of said metal foil.

22. (Previously Presented) The molecularly flexible dielectric electronic substrate of claim 9 wherein said conductive vias are built up of plated metal.

23. (Previously Presented) The molecularly flexible dielectric electronic substrate of claim 9 further comprising a plated electrically conductive layer on at least the contact sites of said first metal foil.